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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/781,876

02/20/2004

Cheng-Cheng Liu

BHT-3183-65

5151

7590

10/06/2004

TROXELL LAW OFFICE PLLC
SUITE 1404
5205 LEESBURG PIKE
FALLS CHURCH, VA 22041

EXAMINER

VU, HUNG K

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 10/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/781,876

Applicant(s)

LIU, CHENG-CHENG

Examiner

Hung Vu

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. ____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>02/20/04</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, 5, 7, 8 and 10 are rejected under 35 U.S.C. 102(a) as being anticipated by Lin (PN 6,677,668).

Lin discloses, as shown in Figures 2A-2C and 5A-5B, a multi-chip package combining wire-bonding and flip-chip configuration comprising:

a substrate (10) having an upper surface and a lower surface, the substrate having a plurality of contact pads on the upper surface;

at least a wire-bonding chip (120) attached to the upper surface of the substrate and electrically connected to the substrate through a plurality of bonding wires;

a molding compound (125) formed on the upper surface of the substrate, and sealing the wire-bonding chip and the bonding wires, wherein the molding compound has at least a recession to expose the contact pads;

at least a flip-chip type electrical device (160') having a plurality of bumps, wherein the flip-chip type electrical device is mounted on the upper surface of the substrate through the connection of the bumps to the contact pads.

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With regard to claim 5, Lin discloses the molding compound further has an extension from the recession.

With regard to claim 7, Lin discloses the flip-chip type electrical device is a BGA package, a chip scale package or a flip-chip.

With regard to claim 8, Lin discloses the package further comprising a plurality of solder balls on the lower surface of the substrate.

With regard to claim 10, Lin discloses the molding compound has at least a step on the exposed surface of the molding compound.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (PN 6,677,668).

With regard to claim 2, Lin discloses the claimed invention including the package as recited in the rejection above. Lin does not disclose a distance from the recession of the molding compound to the contact pads is more than 1.0 mm. Although Lin does not teach the distance

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from the recession of the molding compound to the contact pads, as that claimed by Applicants, however, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the recession having a desired distance, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With regard to claims 3, 4 and 6, Lin discloses the claimed invention including the package as recited in the rejection above. Lin does not disclose the recession is in a shape of an arc or a quarter-circle, and the molding compound is in a L-shape or U-shape. However, the shape differences are considered obvious design choices and are not patentable unless unobvious or unexpected results are obtained from these changes. It appears that these changes produce no functional differences and therefore would have been obvious. Note *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Circ. 1990).

3. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (PN 6,677,668) in view of Bernier et al. (PN 5,847,929).

Lin discloses the claimed invention including the package as recited in the rejection above. Lin does not disclose the package further comprising a heat sink attached to the molding compound and the flip-chip type electrical device. However, Bernier et al. discloses a package combining wire-bonding and flip-chip configuration comprising a heat sink (224, 540) attached to the molding compound and the flip-chip type electrical device. Note Figures 1-8 and 11-14 of Bernier et al.. Therefor, it would have been obvious to one of ordinary skill in the art at the time

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the invention was made to form the package of Lin further comprising a heat sink, such as taught by Bernier et al. in order to reduce the heat generating in the package.

4. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (PN 6,677,668) in view of Chung et al. (PN 6,525,406).

Lin discloses the claimed invention including the package as recited in the rejection above. Lin does not disclose the molding compound has at least an indentation on the exposed surface of the molding compound. However, Chung et al. discloses a package comprising a molding compound having at least an indentation (48) on the exposed surface of the molding compound. Note Figure 7 of Chung et al.. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the molding compound of Lin having at least an indentation on the exposed surface of the molding compound, such as taught by Chung et al. in order to serve as a recognition mark for marking the molding compound.

5. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (PN 6,677,668) in view of Tao et al. (PN 6,191,360).

Lin discloses the claimed invention including the package as recited in the rejection above. Lin does not disclose the upper surface of the substrate includes a flip chip region exposed to the molding compound and a molding region, the substrate has a molding gate metal layer extending to the molding region opposing to the recession. However, Tao et al. discloses an upper surface of a substrate (30) includes a flip chip region exposed to a molding compound (38) and a molding region, the substrate has a molding gate metal layer (32) extending to the molding

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region opposing to the recession. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the substrate of Lin having a molding gate metal layer, such as taught by Tao et al. in order to assist in removing the molding compound formed on top of the molding gate metal layer.

Conclusion

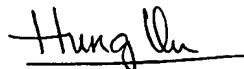
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (571) 272-1666. The examiner can normally be reached on Mon-Thurs 6:00-3:30, alternate Friday 7:00-3:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (571) 272-1732. The Central Fax Number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

September 20, 2004



Hung Vu

Patent Examiner